REMARKS

In order to overcome the drawing objections, amended drawings are enclosed herewith wherein the various elements shown in Fig. 4 have been labeled. Also, on sheet 1 of the drawings including Figs. 1 - 3, the symbols - and + for the grounded and the high tension electrodes have been identified.

The Examiner has rejected claims 1 - 2 under 35 USC 103(a) as being unpatentable over Schoenbach (Bacterial Decontamination of Liquids with Pulsed Electric Fields) in view of Torsten (DE 198 59 459) and Mittal et al. (US 6 093 432).

Schoenbach reports on the effect of pulsed electric fields on the viability of microorganisms, mainly bacteria in liquids when subjected to pulsed electrical fields. It examines the effects of different electrical pulse parameters, such as pulse shape, amplitude, duration and single-shot versa repetitive operation.

Thorsten et al. (DE 198 59 459) discloses a micro-system for cell permeation and cell fusion of microscopic objects in a medium dispersed between at least two electrodes wherein the electrodes are miniaturized electrodes disposed in a micro-system with a channel structure through which a flow medium including the microscopic objects is conducted.

Mittal et al. (US 6 093 432) relates to a method and apparatus for electrically treating foodstuffs for preservation wherein the foodstuff is conducted through a treatment chamber in which it is subjected to electrical pulses for non-thermal pasteurization and sterilization. Instan- charge-reversal ectric pulses are applied to the foodstuff disposed in the treatment chamber between two electrodes, each pulse having a pulse width of 1 - 5 μs. The electric pulses which are low energy pulses but have instant charge reversals have been found to have much greater microbial killing power than pulses of other pulse wave forms used to treat foodstuffs. The apparatus uses an electrode arrangement including a cylindrical inner electrode and an annular disc with the cylindrical electrode extending through the opening in the annular disc.

None of the references discloses the feature of present claim 1 wherein the pulse-like electric field between electrode groupsextend in such a way that the field axes do not extend normal to the longitudinal reactor axis. That is, the field axes between the electrodes extend through the reactor at an angle to the longitudinal reactor axis so that the products moved

through the reactor are exposed to a particular field axis for a longer time than they would if the field axis would extend through the reactor at a right angle to the longitudinal reactor axis as it is generally the case in all prior art arrangements.

This feature can also not be derived from Torsten et al., as alleged by the Examiner.

Torsten et al. is basically concerned with the reversible cell permeation (col. 1, paragraph 2). Torsten et al. would not be considered by a person skilled in the art as representing relevant prior art already for that reason. In addition, Torsten et al. does not state with regard to the Fig. 7 thereof that the field axes of the electric field which is used for the pasteurization by electroporation do not extend normal to the longitudinal axis of the reactor.

Fig. 7 shows two different types of electrodes, namely the deflection electrode 76 and the electroporation electrodes 77 and 77a (see column 7, lines 16 - 58).

The deflection electrode 76 is provided to generate an inclined electrical field; but this field is not provided for the electroporation but serves as a field barrier for relatively large, but not for small cells. The inclined field consequently does not serve for the destruction of cells not even for the reversible perforation of cells but solely for the separation of cells of different sizes in order to conduct them through different channels.

The electrodes 77 which are provided for the electroporation of the cells establish a conventional electroporation field whose axes extend normal to the flow direction that is normal to the longitudinal axis of the flow channels. Consequently, Torsten et al. does not disclose, or in any way suggests, the method according to the present invention.

The apparatus shown in Torsten et al. is actually not even suitable for performing the method according to the present invention. A person skilled in the art could not even have detected from a consideration of Torsten et al. or from one of the other references cited by the Examiner the problem being solved by the present invention, and much less the solution for the problem. It would not have been possible just from the knowledge of the cited references that, in the electroporation of noncircular cells, for example elongated cells, which, furthermore, are not present as individual cells but as cell tissue, for example as beets or beet slices, the cells are not fully electroporated by the exposure to an electric field which extends normal to the travel direction of the cells. The solution as proposed by the present invention that is that the pulsed electric electroporation field axes extend through the treatment chamber at an angle to the longitudinal axis and at a certain potential difference of 10V for a duration of 1 μs, prefera-

bly in various directions as indicated by Figs. 1 – 3, is not disclosed nor is such a procedure rendered obvious by the cited references.

It is noted that, with the method according to the present invention, electroporation fields can be generated as shown for example in Figs. 1 - 3 which fully permeate the treatment channel for elements carried through the channel. The establishment in treatment channels of electroporation fields including field axes extending at various angles relative to the longitudinal axes of the channels is clearly not disclosed by the cited references nor can any hint in this respect be provided by the cited references.

Reconsideration of the rejection of claim 1 of the present application under 35 USC 103 is therefore respectfully requested.

Claims 2 and 3 are directed to features considered to be advantageous in connection with the method as defined in claim 1.

Claims 2 and 3 are dependent directly or indirectly on claim 1 and, consequently, include all the features of claim 1 so that they should be patentable already for that reason.

Reconsideration of claims 2 and 3 is also requested and allowance of claims 1 - 3 is solicited.

Respectfully submitted,

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Mailstop: Non-Fee Amendment

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